

Application Number 09/995,175

Responsive to Office Action mailed May 5, 2004

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application.

Listing of Claims:

Claim 1 (Currently amended): A servopositioning system for a data recording system, comprising in combination:

- a) a linear data recording medium, upon at least a portion of which are written at least one amplitude-based servo pattern signal, and at least one time-based servo pattern signal, wherein the amplitude-based servo pattern includes servo windows and edges of the servo windows define servo tracks of the amplitude-based servo pattern, and wherein the time-based servo pattern includes a first pulse and a second pulse wherein at least a portion of the first pulse defines a different slant angle than a corresponding portion of the second pulse, the slant angles of the first and second pulses being defined relative to a vertical transverse direction across a width of the medium; and
- b) circuitry, separately responsive to the amplitude-based servo and time-based servo patterns signals, for producing respective position error signals from each servo pattern signal.

Claim 2 (Currently amended): The system of claim 1, in which the amplitude-based servo pattern signal and the time-based servo pattern signal are written to the medium on at least a portion of a common location of the medium.

Claim 3 (Currently amended): The system of claim 2, in which the amplitude-based servo pattern signal and the time-based servo pattern signal are written to the medium in a common location of the medium.

Claim 4 (Currently amended): The system of claim 1, in which the circuitry separates the amplitude-based servo and time-based servo patterns signals from a composite input.

Application Number 09/995,175

Responsive to Office Action mailed May 5, 2004

Claim 5 (Currently amended): The system of claim 4, in which the amplitude-based servo and time-based servo patterns signals have respective absolute amplitudes that are controlled to provide linearity to the entire system.

Claim 6 (Currently amended): The system of claim 4, in which the circuitry ~~further comprises~~ performs crosstalk cancellation of the amplitude-based servo and time-based servo patterns signals.

Claim 7 (Currently amended): The system of claim 1, in which the amplitude-based servo pattern signal comprises a sine-periodic signal wave-recorded in an area band-surrounding the servo windows and wherein the servo windows comprise erased windows where the periodic signal is erased, ~~the edges of which form a series of servo track pitches.~~

Claims 8-9 (Canceled)

Claim 10 (Currently amended): The system of claim 1, in which the amplitude-based servo pattern signal and the time-based servo pattern signal are written on different physical locations of the medium.

Claim 11 (Currently amended): The system of claim 10, in which the amplitude-based servo pattern signals have defines a track width approximately equal to a write track width.

Claim 12 (Currently amended): The system of claim 10, in which the time-based servo pattern signals have defines a track width much less than a track pitch of the medium.

Claim 13 (Currently amended): The system of claim 1, further comprising a servo controller having a seeking mode in which the servo controller depends primarily on the time-based servo pattern signals.

Claim 14 (Currently amended): The system of claim 13, in which the servo controller depends on position error signals that are produced by based on detection of the amplitude-based servo pattern signals at servo track boundaries.

Application Number 09/995,175

Responsive to Office Action mailed May 5, 2004

Claim 15 (Currently amended): The system of claim 1, further comprising a servo controller having a tracking mode in which a DC portion of position error signals is obtained from the time-based servo pattern signal.

Claim 16 (Currently amended): The system of claim 1, further comprising a servo controller having a tracking mode in which a high frequency portion of the position error signals is obtained from the amplitude-based servo pattern signals.

Claim 17 (Currently amended): A method of ~~servo~~positioning for use with a data recording system, comprising:

- a) writing upon at least a portion of a linear data recording medium at least one amplitude-based servo pattern signal, and at least one time-based servo pattern signal, wherein the amplitude-based servo pattern includes servo windows and edges of the servo windows define servo tracks of the amplitude-based servo pattern, and wherein the time-based servo pattern includes a first pulse and a second pulse wherein at least a portion of the first pulse defines a different slant angle than a corresponding portion of the second pulse, the slant angles being defined relative to a vertical transverse direction across a width of the medium. ; and
- b) ~~producing respective position error signals from each servo signal.~~

Claim 18 (Currently amended): The method of claim 17, further comprising writing the amplitude-based servo signal pattern and the time-based servo signal pattern to at least a portion of a common location of the medium.

Claim 19 (Currently amended): The method of claim 18, further comprising writing the amplitude-based servo signal pattern and the time-based servo signal pattern to a common location of the medium.

Application Number 09/995,175

Responsive to Office Action mailed May 5, 2004

- Claim 20 (Currently amended): The method of claim 17, further comprising:
separating the amplitude-based servo and time-based servo signals patterns from a composite input; and
producing respective position error signals from each of the servo patterns.
- Claim 21 (Currently amended): The method of claim 20, in which the amplitude-based servo and time-based servo signals patterns have respective absolute amplitudes that are controlled to provide linearity to the entire system.
- Claim 22 (Currently amended): The method of claim 20, further comprising reducing crosstalk between the amplitude-based servo and time-based servo signals patterns.
- Claim 23 (Currently amended): The method of claim 17, further comprising writing the time-based servo signal pattern at the a-slant angles relative to the transverse direction of the medium, and ~~the method further comprises placing the amplitude-based servo signal pattern in an azimuth null of the time-based servo signal pattern.~~
- Claim 24 (Currently amended): The method of claim 17, further comprising writing the amplitude-based servo signal pattern and the time-based servo signal pattern on different physical locations of the medium.
- Claim 25 (Currently amended): The method of claim 17, further comprising writing the amplitude-based servo signals pattern to have a track width approximately equal to a write track width.
- Claim 26 (Currently amended): The method of claim 17, further comprising writing the time-based servo signals pattern to have track width much less than track pitch.
- Claim 27 (Currently amended): The method of claim 17, further comprising producing respective position error signals from each of the servo patterns and executing a seeking mode in which a the-servo controller depends primarily on the time-based servo signals pattern.

Application Number 09/995,175

Responsive to Office Action mailed May 5, 2004

Claim 28 (Currently amended): The method of claim 17, further comprising producing respective position error signals from each of the servo patterns and using a servo controller that depends on position error signals that are produced based on detection of by-the amplitude-based servo signals pattern at servo track boundaries.

Claim 29 (Currently amended): The method of claim 17, further comprising producing respective position error signals from each of the servo patterns and using a servo controller that has a tracking mode in which a DC portion of the position error signals is obtained from the time-based servo signal pattern.

Claim 30 (Currently amended): The method of claim 17, further comprising producing respective position error signals from each of the servo patterns and using a servo controller that has a tracking mode in which a high frequency portion of the position error signals is obtained from the amplitude-based servo signals pattern.

Claim 31 (Currently amended): A magnetic data read-while-write head, comprising:

- a) two pairs of oppositely arranged time-based servo reading gaps and amplitude-based servo reading gaps that are larger than the time-based servo reading gaps, wherein the amplitude-based reading gaps read from a magnetic medium an amplitude-based servo pattern including servo windows with edges that define servo tracks of the amplitude-based servo pattern, and wherein the time-based servo reading gaps read a time based servo pattern including a first pulse and a second pulse wherein at least a portion of the first pulse defines a different slant angle than a corresponding portion of the second pulse, the slant angles being defined relative to a vertical transverse direction; and
- b) between the pairs of oppositely arranged servo reading gaps, matched thin film magnetoresistive data read/write gaps that read data signals recorded between servo bands of the magnetic medium.

Claim 32 (Original): The head of claim 31, in which the amplitude-based servo reading gaps are sized for a servo track width approximately equal to a servo track pitch.

Application Number 09/995,175

Responsive to Office Action mailed May 5, 2004

Claim 33 (Original): The head of claim 31, in which the servo reading gaps define gap lines for servo writing.

Claim 34 (Currently amended): A servo writing head, comprising at least one set of time-based servo writing gaps arranged at a slant angle and at least one set of amplitude-based servo writing gaps, configured so that the head can simultaneously write pulses for a time-based servopositioning pattern and erase windows for an amplitude-based servo pattern, wherein the amplitude-based servo pattern includes servo windows and edges of the servo windows define servo tracks of the amplitude-based servo pattern, and wherein the time-based servo pattern includes a first pulse and a second pulse, wherein at least a portion of the first pulse defines a different slant angle than a corresponding portion of the second pulse, the slant angles being defined relative to a vertical transverse direction across a width of a medium recorded by the head.

Claim 35 (Original): The head of claim 34, in which there is at least one set of oppositely arranged time-based servo writing gaps so that the time-based servo pulses can be written in either forward or reverse direction.

Claim 36 (New) A magnetic tape comprising:

an amplitude-based servo pattern including servo windows, wherein edges of the servo windows define servo tracks of the amplitude-based servo pattern; and

a time-based servo pattern, wherein the time-based servo pattern includes a first pulse and a second pulse wherein at least a portion of the first pulse defines a different slant angle than a corresponding portion of the second pulse, the slant angles being defined relative to a vertical transverse direction across a width of the tape.

Claim 37 (New) The magnetic tape of claim 36, wherein the amplitude-based servo pattern and the time-based servo pattern overlap in a common servo band of the tape.

Claim 38 (New) The magnetic tape of claim 36, wherein the amplitude-based servo pattern is recorded in an azimuth null of the time-based servo pattern.